13 #6

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JUNE 28, 29, 30; July 1, 1926

MONTHLY REVIEW

Published by the

American Electroplaters' Society

ONEIDA, NEW YORK

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EDITORIAL

TIME

Here it is time for another issue of the REVIEW and I must write a page or so, and what shall I write about? So, I say to myself, Why not write about something important, and just now the most important thing I can think of is time, so here goes an editorial on Time. I hope it will not be time wasted. We are reminded that time brings many changes, and that the time has come to change editors for the REVIEW. I have enjoyed the experience the editor's work has brought to me—the very pleasant relationship that has existed between this office and the other officers of the Society, as also the members. And as I am writing about Time, I want at this time to express my appreciation to the officers and members of the A. E. S. for their kindness and patience with me during the three years I have served as editor of the REVIEW. Time also makes us conscious of our limitations and mistakes—yes, time finds the mistakes sometimes as soon as the REVIEW is off the press, but continue to be patient, boys, time also brings many improvements, and along with the new editor, time will bring many improvements to the REVIEW. Time must also bring many improvements to the entire membership. This will mean a continual improvement in the character of the material that will be sent in by the membership for the editor to select from, for the Better REVIEW that time is sure to bring. Time talks. Time will tell how inefficient our present plating practice is. Time will tell how to correct the many errors of our present practice. Our big job

is to make time tell us something useful every day, that we may cut the time between the now and when our goal as an organization may be more perfectly realized. Time certainly has brought to us many worth-while helps during this year. Time will also tell us of the value of the Annual Conventions of the A. E. S., but don't wait for time to tell you the value of the Newark Convention. Now is the time to pack your grip and be ready for the Fourteenth Annual Convention at Newark, N. J. And as time moves on may the spirit of friendship and good will continue to grow among the members of the A. E. S. and may the Society grow in usefulness and be a greater factor for good, and make a definite contribution towards the happiness of mankind as well as towards the improvements of the Art of Electrodeposition of metals. It is time now to bid you all farewell as Editor of your REVIEW.

"CHROMIUM AND CADMIUM PLATING"

By C. H. Humphries

Presented at Chicago Branch Annual Banquet

Gentlemen: It has been just two years since I had the pleasure of coming and talking to you about cadmium and you all know what strides have been made with cadmium plating and of the usages it has been given since that time.

Three years ago when I addressed this branch in the rooms of the State-Lake, we were just beginning to plate with cadmium. I had a few pieces like the pieces of chromium that I have now. It was not thought at that time that the use of cadmium would grow as fast as it has. I understand there are over one thousand firms in the States who are using cadmium, not because of ease of application, but for its proven utility. Those of you who are familiar with the development of cadmium plating appreciate that we as yet have only scratched the surface so far as the possibilities are concerned.

Chromium has been worked on for a longer time than cadmium, but only in the last two years have there been any noticeable results from those efforts made.

In the year 1854, Dr. Bunsen determined to find out whether chromium could be prepared electrolytically.

Many efforts have been made to work out a chromium solution which would give deposits which were at least similar in some of their properties to the qualities of other electrodeposited metals. But it was not until the year 1920 that Sargent struck a solution that had any deposits at all like those required for an electroplating operation. This announcement was something that was worth while, a metallic deposition that had properties for which many were seeking, and which would fill gaps that were left by the metals that were electroplated commercially.

Our work on chromium plating was started over ten years ago, when we were developing Stellite alloys and Stainless steel, the base of each being chromium. No public announcements have ever been made as to details of our process for obvious reasons, and no effort was made to commercialize chromium planting until one year ago. Our solutions are easily maintained and current densities compare favorably with current used in nickel plating.

Chromium is an extremely hard metal. It has a melting point as high as platinum, but it does not flow readily until another 400° Centigrade is reached. You must have a temperature around 2250° Centigrade to get chromium to flow. It is not readily affected by nitric acid, or the common fatty acids, such as you find in foods. It is extremely hard to scratch, as it is more than seven times as hard as nickel—by scratch test. So, the combination of chemical properties and this feature of hardness make it fit into many places where the present metals that we have don't fit. In addition, its position in the electro-motive scale of elements places it between zinc and cadmium, which means it is above iron and should therefore exert a protective action just as zinc does on steel. With the case of tin, just the opposite is true. It is for this reason that articles covered with tin and nickel are not protected in the same way as those articles that are protected with zinc. Here we have a metal, then, that is not attacked readily by acids except hydrochloric, is hard and is particularly protective as regards its resistance to atmospheric agencies; and therefore should be used as a rust-protecting medium, or as a covering.

Cadmium and zinc are both used as metals to protect

iron or steel articles. The particular limitation of cadmium, in many cases, is its softness. When you want to apply it to an article on which you don't want its finish damaged by a scratch, you don't get the necessary protection. Cadmium is soft, it is readily scratched, and the finish of the article is imperilled. Zinc is the same as cadmium to a lesser extent. Nickel finishes are much harder, and, though they will scratch, they are not marred the same as the cadmium or zinc plates. Where it is not only necessary to have the article stand up, say, in moist atmosphere, but it is necessary also to retain its finish in stock, then chromium is the metal to use.

Nickel gradually tarnishes and you get erosion. Small rust spots appear and the beauty of the finish is lost. With chromium you have a metal which takes a high luster and which under no conditions of the atmosphere changes its color. You have a protective value which is somewhere between zinc and cadmium, as opposed to the lack of protective value which you get with nickel.

Chromium has a beauty of its own; it looks like platinum, it has a bluish cast as opposed to the yellowish cast of nickel. When they are compared, side by side, the contrast is so great that nickel is discarded on account of its sickly yellow appearance.

Chromium is going to fit into places where finish is not considered at all. It is extremely hard, and for this reason none of the standard buffing compositions can be used, because they won't touch it. Chromium can be used for the covering of steel articles, such as cams, at present case-hardened, and where the surface of the cam or tappet is to be saved from great wear. In some of the present eight and six cylinder automobile engines the movement of the cams or the tappets which actuate the valves occurs a great number of times per minutes, and if the particular tappets do not spin, then there is a gradual wearing into the surface of the tappet, a groove from the rotation of the cam. The automobile manufacturer spends considerable money in the hardening of these particular pieces. Now he can take the standard stock testing 60 on the scleroscope, and, instead of case-hardening it, he merely puts on a quantity of chromium and then you have a cam which is hard

enough to assume the normal wear of such a particular article.

There are other uses of the same character for other wearing parts, such as crank and pump shafts and for rotating parts run at a high speed without lubrication.

We are not interested so much in the question of chromium plating from the plating standpoint as we are in the use of chromium plates as a protective medium against erosion.

The original solution Dr. Bunsen made in Germany was a chromium solution, and the type of deposit was something like a burnt nickel. Such were not buffable and had no value at any time to other than the chemists.

The experiments of Placet and Bonnet, which have been recorded by Richards, are probably the most complete of any that have yet been compiled on chromium plating. That is the first booklet to obtain, as it is quite a history of the whole subject up to the time of Sargent in 1920.

Solutions such as chromium sulphate, and solutions of chrome alum with additions of such things as sodium sulphate, have been tried, but none give any deposits that have any value so far as its after-working was concerned.

The Sargent solution consists of chromic acid, containing approximately two pounds of chromic acid to a gallon of solution, and to this acid is added around one-fourth to one-half per cent of the chromic acid present, as chromium sulphate. Such a solution is a deep heavy orange colored solution, having a Baume reading of about twenty, and is quite acid. Chromic acid is an extremely strong oxidizing agent. This solution, which, I say, is chromic acid, is vastly different from the average plating solution that the plater uses.

With reference to the Sargent solution, the solution was used in the original experiment at a current of one ampere per square inch, or one hundred fifty per square foot.

When you talk of currents in the neighborhood of one hundred amperes per square foot the average plater immediately loses interest. He imagines he will need a power plant in his plating room to start to plate. Therefore, many platers who have been in touch with the original information on this subject have naturally lost interest in the

beginning, owing to the extremely high currents that have been used. There are modifications of this solution. Salzer, Leibreich and other investigators have prepared chromium plating solutions which have given results in plating as low as forty and fifty amperes per square foot. But even these are high as compared with those employed in the standard plating methods with the common metals such as nickel and copper.

Another feature is that efficiency is particularly low. When chromium plating you obviously get an evolution of hydrogen. The average chromium solution has an efficiency of 30%, probably a trifle lower. The average is 20%, which means that quite a lot of your electrical energy is being used for other than deposition. One of the reasons of this extremely low efficiency is this: Chromium is present in a form from which it is not readily plated. Notwithstanding this fact, you can still do a great deal of plating on several types of articles, and one of the reasons is: With chromium coats you do not need as heavy a deposit as you do with other metals. For example, the average thickness of nickel plated in a cold solution at a current density of four amperes per square foot is .0003 of an inch in one and a half hours' plating time. 0.0001" of nickel can be buffed without cutting through. Chromium at least one-half that thickness can be buffed without cutting through. Therefore chromium is used both as a protective medium and as a means of withstanding wear.

If you will coat brass faucets with an equal thickness of .00007", they will withstand a daily use on the handle for over two years without cutting through. I understand that in the standard plumbing business where nickel is plated upon brass they try to maintain a thickness of nickel of not less than one and one-half ten thousandths, and that in hotels where such a thickness is used they are well satisfied if it will stand for one year without wearing through. This gives the comparison between nickel and Chromium coats, the nickel being so much thicker.

Chromium solutions are fairly stable, and if certain easy and common checks are made there will be no difficulty in maintaining those solutions so that they will give

fairly even results, both as regards regularity of performance and appearance of work.

I understand that the Bureau of Standards are plating steel engraving plates with chromium rather readily, in a warm solution. They are using that solution which is of the Sargent solution type, with a lead anode, and plating at a period from one-half to one hour, and with a current density between one and two hundred amperes per square foot.

Brass or copper articles plated within a certain current range in a chromium solution will come right out of your solution as bright as newly buffed nickel. There may be a shading from this bright color towards gray on the edges. It is possible to take out many pieces that do not need an after-buffing. That is one reason why Chromium lends itself to industries such as plumbing fixtures, automobile headlights, reflectors and others of that character, where a high finish is desired upon a highly finished article, to start with, and where, owing to the cost, it is impracticable to consider the after-buffing of these same articles.

Then there is another finish which is dead gray, looking like burnt nickel; and another which is a gray, but has a shine to it something like skimmed milk. As we have samples we will pass them around to illustrate the differences in these various finishes. The dead gray will not buff at all, but will only burnish and will give a light luster.

To recapitulate, there are three finishes that you can get from a chromium plating solution:

1. Plate one, which in no case needs buffing. This plate is applied in from four to fifteen minutes and is suitable for bumpers, radiator shells, plumbing fixtures, dental and surgical instruments, etc.

2. The gray one that will buff. This one is commonly put on steel articles, and should be buffed. It takes quite a high luster and it has a color very distinctive from that of nickel.

3. The dead gray that will not buff satisfactorily, but will give merely a light luster.

The problems in chromium plating are not so much with the solution, but are more mechanical and electrical.

In your ordinary nickel plating where you hang pieces of work on a wire, you do, no doubt, get marked differences in resistances shown in the place where the wire is tied on the work rod and where the article is tied to the iron. In the case of nickel that is not noticeable so long as the buffer does not cut through it when buffing, and the majority of pieces that go through the nickel bath have quite a wide variation; but, if you hang the same pieces in a chromium plating bath you will find that a large percentage have nothing on them at all. The reason for this is that the chromium solution is quite a good conductor, and the pieces that have the best contact act selectively and carry the current, and take the deposit to themselves.

The problems of chromium plating are: First, the method of making proper contacts to the pieces; secondly, the selection of the proper current for the individual piece to obtain the type of deposit desired.

With regard to the specific use of chromium for the protection of iron and steel articles against erosion, and corrosion, with the exception of hydrochloric acid. That means that you can line vessels in which cooking is to be done, and machinery and appliances which are to be used in the food packers' plants, and get protection without any danger of toxic affects such as you get with zinc or cadmium. Chromium can even be used to line pitchers within which lemonade is put, which, of course, cannot be done with zinc and cadmium.

Now, as regards the value of chromium as a protection against the ordinary atmospheric agencies or against moisture, here is a simple test:

Take a standard nickel plated bumper and place it into a barrel of water. By leaving half out and half in, you will find that in twenty-four hours you have rust areas underneath the water, and at the jointure you have a black line. Some chromium plates have stood the same test for four months without a mark on them.

Chromium is filling the place where zinc or cadmium or nickel won't fill, because you have the combination of finish, protective values, and particular features of hardness; whereas, in cams, etc., it may be used to substitute for mechanical operations such as case-hardening, and as

such it has its place among the many other tools that we have in our tool boxes.

I will be glad to answer any specific questions before I leave.

Questions

Q. The gentleman has told us that chromium cannot be buffed with any of the common compounds. What do they use for buffing chromium to polish it?

A. We have a compound that is of a certain degree of fineness, and that has been made up with standard stearic acid, which compound has been found to be particularly valuable and useful.

Q. Is such a compound on the market?

A. Not as yet. We have made it for our own use only. The buffing of chromium is not a buffing proper; it is really a polishing operation on the buffing wheel.

Q. Can you tell us how they get rid of their fumes at the high current density?

A. In chromium plating, owing to the low efficiency, you get a lot of gases. Such a solution is extremely dangerous and is harmful, attacking the nose, and has a tendency to cause the septum of the nose to become pierced. For this reason a very good ventilation is necessary. In our own case we have provided a duct in the plating room.

Q. Is that arranged on the edge of the tank?

A. The duct sink is just a little over the edge of the tank with an exhaust on one end.

Q. Could chromium be used in case of tools, for, say milling machines?

A. I doubt whether you would get the service there with the thickness of coating that you could put on. It could be used solely as a temporary means of protecting them in storage, but as regards the action during the cutting, the chromium would be removed.

Q. Can a metal being 95% tin and the balance copper be chromium plated?

A. I think such an alloy can be plated readily. This summer we have had on test some larger copper coils. These were treated for the fruit concentration trade, where tomatoes were concentrated so that they could be

put up as canned tomatoes, and the chromium has been substituted and is outlasting the silver for such solutions.

Q. What is the throwing power of chromium?

A. Not very good. In many cases the throwing power is so poor that it is oftimes necessary to use special anode arrangements to get it to throw at all. Throwing power is probably as good as in an acid copper solution.

Q. How about patents on the chromium situation?

A. Patent situation on chromium has not yet been settled.

Q. Is there any particular reason why in the plating of chromium on a brass surface there should be a desirability to use a higher voltage than, for instance, on steel?

A. That hasn't been my experience.

Q. I have also heard that where they are turning work out on a large scale they are using what we term "high voltage" flash. For instance, if you plate nickel or brass on steel and then want to chromium plate it, is it not necessary to use what is termed a "high voltage" flash and after the chromium takes use a lower voltage?

A. It is not necessary, and good plates can be gotten in low current density. On the average brass articles an initial current density of 30 amperes can be used without any kick-off.

Q. Would you just tell us briefly of the fact that there are various different kinds of chromic acid found on the market, some of which will do the work and some of which will not? Only after making a third solution did I get results, and this was obtained from a concern not from this part of the country—but from the East. The chemicals purchased were bought from the best chemical houses here, and they didn't work, but this chromic acid did work.

A. Chromic acid has certain specific uses, none of which had anything to do with plating and its specifications from a plater's standpoint have not been yet worked out. The only ones of assured character are the chemically pure grades. These are said to be good. The specifications for the chromic acid used have not yet been made public. But this general statement is good: "Any sample of chromic acid that contains more than 0.7 per cent of SO_4 is not going

to be worth while as a plating base. It will require too high an initial current, and the result will not be desirable.

Q. That is true, and unless I got the current up to, say, about 200 amperes per square foot, I couldn't plate at all. I simply had a chromium oxide on the cathode.

A. In general, the specifications are that they should be free from sulphates and should contain only traces of alkali. The percentage of sulphate should not exceed one-half of one per cent.

Q. There is then no standard as yet that can be relied on?

A. No.

"PLATING DEPARTMENT LABORATORY"

Paper by Charles C. Martel, "Plating Department Laboratory"

Mr. Chairman and Gentlemen:

Under the hand of the careful gardner "The useless plants are uprooted. The struggling and weakly branches pruned, that which is valuable trained. Order reigns. And what was a tangled mass becomes a pleasure to the eye."

The foreman electroplater of today must be careful. Uproot the useless plans. Prune the dead branches. Train that which is valuable in order to produce from a tangled mass articles that are a pleasure to the eye.

The electroplaters of today are adopting every facility available in order to improve the quality of their finished product, and should insist on having some kind of a small room that he may use as a small laboratory. The writer has never been refused a small space for research work, providing he did not ask for a laboratory that was lrger than the plating department he was in charge of.

Also do not think all the funny things, such as glass dishes and bent glass tubes, as are used in the laboratory will not make mistakes, or will at all times produce absolutely correct results, as they are sometimes used in plating department laboratories.

This assertion applies to the careless methods adopted by some chemists of keeping titrting solutions made up in large amounts in properly stopped bottles, and not making a proper check of titrating solutions each time they are used. Eternal vigilance must be the rule at all times when

checking plating solutions and chemicals. The chemist must not be interrupted; in other words, he must concentrate his whole mind on the test he is making.

The following is from Chapter 3, "Theory of Indicators" Book, page R43, "The Determination of Hydrogen Ions," by W. Mansfield Clark, MA., PH.D.:

The color charge of an indicator cannot fail to excite the wonder of every observer. We must choose that which is useful to the purpose at hand and include only so much of each phase as will contribute toward avoidance of the more serious mistakes. Thus proving that chemists sometimes make mistakes. If the above sentence is observed and followed a great many mistakes will be avoided.

The writer's conception of an ideal plating department laboratory would provide means for scientific tests or check up of all plating done under his supervision. Every way of simplifying the check up of plating solutions and chemicals, also operating the same, after being proven as practical, would be adopted.

How many executives of plating departments have time during the day to find out approximately how much boric acid their solutions contain? Not very many. If the volumetric method of tritrating in the presence of glycerine is used ,the following method of detecting the presence of boric acid in a nickel solution may be used to advantage by platers that have no laboratory if at any time he should want to find out if his nickel solution contains boric acid:

First

Purchase a small oven or make one as follows: The oven used for this purpose by the writer was maintained at 280 F. to 300 F. Made as follows:

Ten inches deep, by ten inches wide, by twelve inches high.

Galvanized sheet iron. Inside of oven lined with asbestos. Door of oven covering the whole front of same. Swinging on hinges and fastened with a latch catch. With a small vent on bottom of door; also a small outlet tube in center of top of oven.

Half-way from top to bottom of oven, inside, a brass

mesh partition to be used as a shelf for holding evaporating dishes.

On inside bottom of oven the heat is generated from four or more electric light bulbs, thus furnishing dry heat.

Second

Four or more evaporating dishes should be on hand.

Third

1. Graduated TEST TUBE, 25 cc. is recommended.

Fourth

A small amount of alcohol. With this outfit the plater can proceed as follows:

Standard Solution

Make a standard solution, using the formula you have been operating in your plating department, using the amount of boric acid you prefer in your working solution—two, three or four ounces—what you think best for your line of work. We will say one gallon of standard solution contains two ounces of boric acid, now compare the amount of boric acid in your regular plating solution.

First

Take 10 cc. of the standard solution, measured as accurate as possible, and put same into an evaporting dish.

Second

Take 10 cc. of the solution you wish to test, measured as accurately as possible, and put same into another evaporating dish.

Third

Then put both evaporating dishes that contain the solutions into the oven and leave them in the oven until both solutions are crystallized. When there is no more moisture left in the two dishes, remove them from the oven and let them cool just a little.

Fourth

As the contents of each is now a solid mass, the operator will now take two glass stirring rods, one for each dish, stir the contents of each until the mass in each is pulverized, or nearly so, then add to each evaporating dish 10 or

15 cc. of alcohol. Stir each thoroughly and ignite the alcohol of one dish at the time.

Fifth

As follows: Ignite the alcohol in the dish that contains the standard solution. The blaze being light green, this color will remain only while there is boric acid. When the color changes is the point to observe.

The next operation is to ignite the alcohol in the evaporating dish containing the mass you are testing. Timing the green flame just as you did with the standard solution, comparing time of green blaze, will show approximately how much boric acid your solution contains.

In conclusion, the writer did not mention any data regarding the timing of green blaze in consuming a certain weighed amount of boric acid, there being no equipment at hand to do the checking up with. Any foreman plater can adjust the timing to conform with the facilities, or, in other words, to the outfit he has at hand.

The writer is indebted to Dr. C. F. Burgiss and Mr. Richardson, a co-worker, for this method of blow-pipe testing for detecting the presence of boric acid.

Thanking you, Mr. Chairman and Gentlemen.

BRASS PLATING OF ANTIMONIAL LEAD

Paper No. 14

By Jos. San Pietro, N. Y. Branch

In presenting this paper this afternoon, gentlemen, on the subject of brass plating of antimonial lead, I do not feel as though it is possible for me to offer anything new on the subject, but still, in the hope that I may bring out a few points of interest to some one, I will endeavor to put before you for your consideration my experience in the fixture business, my methods, problems, and how I overcame them in the plating of this alloy.

The article to be plated is first polished with either acme or tropoli, washed in kerosene or benzine, so as to remove the polishing composition, dried out in sawdust, and the article is then ready to be plated. The article is then wired up and placed in a very hot solution of a metal cleaner and left in this cleaner until the article turns a

faint purplish color; it is then rinsed out in cold, running water and then placed into the brass solution, composed of 2 ozs. of copper cyanide, 1 oz. zinc cyanide and about 3½ ozs. of free cyanide to a gallon of water, and you can also add about a teaspoon of brightner composed of 1 part of arsenic, 2 parts of caustic soda, 1 part of ammonia and two parts of your brass solution.

The article is then left to plate for about five minutes at a moderate low current, say, about 2 volts, taken out and observed to see if any of the polishing composition was overlooked, and if the article is still uncleaned it is then scratch brushed and put through the same cleaning process as stated before and again placed into the brass solution for the final deposit, and this time it is left in for the length of time required for the finish. After this length of time has expired, the article is then taken out and rinsed in cold water, dipped in a hot solution of whale soap, rinsed in cold water and finally dipped into hot water and dried out in hot sawdust.

The article is then ready for the lacquering department.

I will now tell of some of the problems that I have come across and how I overcame them:

Problem 1—Question: What causes the deposit to turn color when taken out of the solution?

Answer—This coloration is caused by the lack of free cyanide and may also indicate that your solution is low in metal.

Problem 2—Question: What causes your brass anodes to be coated with zinc oxide?

Answer—This is caused by using an excess of ammonia, and to remedy this, just add at intervals a small amount of caustic soda. It is also advisable to add a smll amount of free cyanide. This will help to keep them clean.

Problem 3—Question: What causes the solution to plate a continuous grayish color?

Answer—This is caused by the addition of too much arsenic and there are two days of remedying this: First, is either by working it out, and the other is by making up a new solution.

Problem 4—Question: What causes your deposit to turn a blackish color when taken out of the solution?

Answer—This indicates that too much arsenic has been added; to remedy this do the same as stated in Problem 3.

Last, but not least, I will endeavor to give you my method of testing if arsenic is present in a brass solution:

Take an article and plate in your brass solution for about one-half hour and then dip it into a weak solution of acid composed of 2 parts of sulphuric acid, 1 part of nitric acid; now, if the article turns a black color, this indicates that there is a sufficient amount of arsenic present.

Problem 5—Question: What causes your brass deposit to spit out?

Answer—This is caused by metal being pourous; and the only remedy, not a cure, but to prevent to some extent is by dipping your article for a few minutes in a hot solution composed of 1 part of muriatic acid to 75 parts of water.

BRANCH NEWS

Philadelphia Branch

Philadeplia Branch held its regular meeting at the Harrison Laboratory, U. of P., on May 7, and was exceptionally well attended, as was befitting the speakers and the subjects, and you non-attending members do not really know what you are missing. Just ask any of the members who attend regularly and they will tip you to the good word.

If you, who do not attend, could appreciate just what your omarl support of attending meetings meant to both yourselves and the officers of the Branch, I am sure you would never miss a meeting.

Two applications for active membership were received.

Letters from the Research Committee were received and a committee appointed to assist them in this district. The Educational Committee reported two offers of equipment to start our class in electroplating at the Kensington High School.

Mr. C. F. Bauder, director of vocational training, Philadelphia Board of Education, gave a very interesting talk and expressed the opinion that the committee was doing fine.

Convention Committee reported sending five papers to the Newark Committee.

Mr. Fred Shadell of Boyertown then gave his talk on "Metal Coloring as Practised by the Automobile Trade." He had 28 different samples of finishes and explained the methods of finishing each one. This talk alone was worth any one's time to listen to, and was appreciated by everyone present, for Mr. Shadell knew his subject, and knew it well.

Election of officers was then in order, and the following officers were elected: President, Geo. Gehling; vice-president, P. Kurzeknabe; secretary-treasurer, Philip Uhl; librarian, Willard M. Scott; board of man-

agers, Wm. P. Scott, T. J. Berenato, J. E. Underwood; delegates to the Newark Convention, Geo. Gehling, Philip Uhl, Willard M. Scott; alternates, J. E. Underwood, S. T. Lumbeck, Fred Shadell.

Secretary Uhl reported the financial condition of the Branch was good and the meeting was adjourned at 11:30 P. M., until June 4.

Since the last meeting we have had the misfortune of losing one of our members by death, and I am enclosing his obituary notice. Please note some of it in the REVIEW:

Samuel W. Penrose

While at work yesterday morning, Samuel Winfield Penrose, 55 years old, secretary and treasurer of the Wilmington Electroplating Company, 3101 Market street, dropped dead. Dr. Fred F. Armstrong was summoned and pronounced death due to heart failure.

Mr. Penrose had been in the electroplating business for the past thirty years. He was a member of the Red Men, Odd Fellows, Temple Lodge, A. F. & A. M., Scottish Rite Mason, and the Shrine. He is survived by his wife, Mrs. Elizabeth B. Penrose; a brother, Frank C. Penrose, and two sisters, Mrs. William G. Jones and Mrs. M. W. Shepard.

Philadelphia Branch

June meeting of Philadelphia Branch was well attended. The feature of the meeting was the talk on cleaners by Mr. G. J. Lawrence of the Wyandotte Chemical Company. Mr. Lawrence explained the chemicals and the method used in cleaning the work of the different kinds of metals, etc. This talk was enjoyed by the members, and at the conclusion he was given a hearty vote of thanks.

Balance of the evening was taken up with convention news and problems that turn up occasionally.

Newark Branch

Newark Branch held its regular meeting on Friday evening, May 21, with 19 members present. President Geo. Reuter presided. The application of Arthur F. King for active membership was received and ordered to take the usual course.

Mr. Frank Hennessey was reinstated as an active member.

Mr. Horace H. Smith, chairman of the Convention Committee, outlined the plans for each day of the convention.

Dad Liscomb of Chicago was a visitor.

The election of officers resulted as follows: President, Geo. W. Onksen; vice-president, Chas. Bohler; secretary-treasurer, Royal F. Clark; librarian, Anthony Calabrese; sergeant-at-arms, G. Glickenhaus; trustees, Geo. Reuter, Roy Stout, Oliver J. Sizelove; delegates elected for the convention were: Horace H. Smith, Oliver J. Sizelove, Philip Sievering; alternates elected were Roy Stout, Geo. W. Ouksen, Royal F. Clark.

Fifteen members signified their intention of visiting New York Branch on Friday evening, May 28. Meeting adjourned at 10:50 P. M.

New York Branch

The May meetings of the New York Branch, A. E. S., were well attended and conducted. The features of these meetings were the able addresses of Mr. Wm. Voss of the Hanson Van Winkle Company, on "Celloise Depositing and Graphure Clynindes Depositing of Copper." Mr. Chas. F. Beck of the Yale & Towne Company gave a very interesting talk on "Welfare of Society," and also of "Modern Methods of Plating."

Mr. Royal F. Clark addresser the last of these meetings and gave a very interesting talk on "Modern Methods as Compared With Old-Time Process," and was given a rising vote of thanks by the Branch.

The following men were elected to office for the ensuing year: Franklyn McStocker, president; Arthur Grinham, vice-president; John Sterling, secretary-treasurer; R. J. Lignori, recording secretary; Richard Quinn, librarian; Herman Ruhlman, sergeant-at-arms; B. Nadel, assistant sergeant-at-arms; trustees, Adolph Stremel, Joseph Minges, T. A. Gardener; delegates, Wm. Fisher, Philipp Moriningstar, John Sterling; alternates, Chas. F. Beck, Herman Ruhlman, Adolph Stremel.

Boston Branch

Boston Branch met Friday, the 4th, with the past Vice-President Gale in the chair. After the regular order of business the branch voted not to meet until next September.

Two delegates were elected to the convention. They were Mr. Louis A. Gale and Bart F. Lee.

The following officers were elected for the year 1926-27: President, Louis A. Gale; vice-president, Harry M. Wright; secretary-treasurer, Andrew W. Garrett; librarian, Bart F. Lees; sergeant-at-arms, Wm. Simonetti; trustees, J. Thompson Evans, A. P. Williams, George C. Leach, Lurgi Gilberti and Andrew Talamona.

Edward J. White, 33 Cornwall street, Jamaica Plain, Mass., was suspended.

Toronto Branch

The fourth Monday of May, our regular date of meeting, was Victoria Day, therefore, we held our meeting on May 1. It was a grand evening out in the open—warm, balmy air n'everything. A platers' meeting on a night like that is seldom crowded, but the war horses were there and a few earnest workers.

Billy McCann, who always spreads good cheer, dropped in and said he would meet us in Newark.

The picnic given by Toronton Branch will be held in High Park, June 26. Prizes galore for a fine program of sports are to be donated by members, with special reference to children.

A committee was appointed to visit sick members, so that hereafter we hope to have this phase of our social work attended to creditably. To Mr. Thos. O'Keefe is due the credit for the appointment of the committee. Then came a real turn-over in the various offices. The officers elected for ensuing year were: President, W. S. Barrows, 628 Dover

Court Road; vice-president, John Walker; secretary-treasurer, J. S. Cairns, 10 Wiltshire avenue; librarian, John Acheson; sergeant-at-arms, Joseph Ellis; trustees, Chas. Kemish, Thos. O'Keefe, Wm. Cuming; delegate to convention, W. S. Barrows; alternate, Thos. O'Keefe; sick committee, John Acheson, Thos. O'Keefe, Joseph Ellis.

QUESTION BOX

Question—What is the clear crystalized substance at bottom of old silver solution?

Answer—Presumably carbonates, which sometimes contain about 7 per cent silver.

Question—Can it be used or redeemed?

Answer—Send to refiners with sweeps, or precipitate the silver as chloride.

Question—Have a quantity of zinc corbanate. Now operate an acid zinc solution. How can I use up the carbonate?

Answer—Some might be used to neutralize acidity of the acid solution, or make a cyanide zinc solution for use at a strike.

Question—How can I heat a concentrated sulphuric acid dip?

Answer—With lead steam coil.

Question—What would make a very cheap substitute for lacquer on brass plated tin and steel oil lamp burners?

Answer—Imported white gelentine—4.03 to gallon hot water.

Mr. David Ayers of Prescott, Ontario, presented some specimens of splendid brass plating at our April meeting and the display and Mr. Ayers' paper caused considerable discussion and some doubts, so we asked Mr. Ayers to send other samples. He did so, and at the May meeting we received the subject and viewed the samples. Steel curtain rods, 40 inchs long and ⅜ inch and ¾ inch in diameter were plated inside with equally as good color as the outside. Now, what David wants to know is, what proportion of the electrical current is used plating the interior of the rods? If any member has figured out a similar problem satisfactorily, we shall be glad to hear from him, so we can pass the information on to Mr. Ayers.

Newark Branch

Minutes of June 4 meeting are as follows: Newark Branch held its regular meeting on Friday evening, June 4. After routine of business had been dispensed with, President Reuter called upon Mr. George B. Hogaboom, Past Supreme President, to install the officers for the coming year, which he did with well chosen words.

President George W. Onksen took the chair and officiated for the balance of the evening. All committees of the convention reported progress. All members are urged to attend the June 18 meeting, as it will be the last meeting before the convention, and will be a very important meeting. Meeting adjourned at 10:50 P. M.

Detroit Branch

Regular meeting June 4, with the largest attendance of the year, J. Flanagan presiding.

Three applications were received and referred to the Board of Managers for investigation and approval. After the business of the Branch was disposed of the curtain raised on the feature of the evening—"Prof. D. T. Ewing of the Michigan State College, East Lansing, Mich," who, having mastered (?) the art of chromium plating, consented, on the invitation of the Detroit Branch, A. E. S., to prepare a paper on the subject.

We furnished the cigars, two fair and active stenographers, so as to not miss anything which the learned professor relates, and a happy and expectant crowd from all parts of the U. S. A. and Canada. Well, to make a long story short, give us our MONTHLY REVIEW and the trade papers. They pay dividends.

We listened and held our breath, but nothing doing—"They—**a State college, supported by the taxpayers**"—will apply for a patent on their process discovered when a bottle of (?) was accidentally spilled into the chromium bath. However, we learned that the additional agents were the important factors and that paraffin oil or benzine were fairly satisfactory, but they were not using them in their working baths.

The final results of the lecture was: Information, 1 per cent.; disappointment, 99 per cent.; total, 100 per cent.

After the farce, pointed remarks were made by Dad Liscomb, Walther Allen and the rest of the gang on the subject of the evening and the Newark convention. Adjournment was in order and the gang dispersed none the wiser.

P. S.—The members of the Detroit Branch were shocked to hear of the sudden death of Mrs. B. E. Miller, the wife of one of our most esteemed members, B. E. Miller, plating superintendent of the A. C. Ignition Co., Flint, Mich.

New York Branch Loses Charter Member

We regret very much to report that Mr. Frank Duffy of 1796 Gates Avenue, Brooklyn, N. Y., passed away last week. Mr. Duffy was one of our charter members and was quite active during the early promotion of the A. E. S. and we are sincerely regretful for our loss.

ELECTED TO MEMBERSHIP

Philadelphia Branch

M. A. Berenato, Active .....2213 Pierce St., Philadelphia
Wm. Ackerman, Active .....3524 Calumet St., Philadelphia
J. M. Reynolds.....1809 Berryhill St., Harrisburg, Pa.

New York Branch

Geo. Dietrich, jr. .....1999 Metropolitan Ave., Brooklyn, N. Y.
Geo. H. Hunter .....441 Marion St., Brooklyn, N. Y.
John Rolff .....117-30 168th St., Locust Manor, Jamaica, L. I., N. Y.

Toronto Branch

Benjamin Deakin .....159 Coswell Ave., Toronto, Canada

APPLICATIONS RECEIVED

Newark Branch

Urban A. Mullin....c|o Hoytt Bearings Division, General Motors Corp., Newark, N. J.
Arthur F. King .....23 Franklin St., Newark, N. J.

New York Branch

John Rolff .....117-30 168th St. Locust Manor, Jamaica, L. I.
Henry Levine .....936 East 178th St., New York, N. Y.
Alexander M. Kohn .....2119 East 16th St., Brooklyn, N. Y.

Milwaukee Branch

H. S. Wingert .....Milwaukee, Wis.

Philadelphia Branch

N. Verelle .....1801 Hope St., Philadelphia

REINSTATED

Philadelphia Branch

H. C. Shelly .....Sellersville, Pa.

Chicago Branch

Cecil Knight .....610 Euclid Ave., Glen Ellyn, Ill.

Cincinnati Branch

Al. Yeager .....2021 Sherman Ave., Norwood, Ohio

Pittsburg Branch

Geo. W. Dehn .....7915 Agnes Ave., Detroit, Mich.

RESIGNED

Toronto Branch

J. R. Moore.....Carleton Place, Box 415, Ontario

BOSTON

Regular meetings are held first Friday of each month, at 8 p. m., at the Boston Platers' Supply Co., 202 Friend St., Boston. Secretary, A. W. Garrett, 89 Alexander St., Dorchester, Mass.

BRIDGEPORT

Meets first and third Friday of each month at 62 Cannon St., Room 17, Bridgeport, Conn. Secretary R. J. O'Connor, 1228 Noble Ave., Bridgeport, Conn.

CHICAGO

Meets second Saturday of each month, at 8 p. m., Atlantic Hotel, 316 S. Clark St. Secretary, Robt. Meyers, 2432 Wilson Ave., Chicago, Ill.

CINCINNATI

Meets every Thursday, 7:30 p. m., at Vocational Training School, Spring and Liberty St. Secretary, W. J. Husing, 729 McMakin Ave., Cincinnati, Ohio.

CLEVELAND

Meets first Saturday of each month at Hotel Winton. Secretary, H. S. Kneeland, 3924 Clybourne Ave., Cleveland, Ohio.

HARTFORD-CONN. VALLEY

Meets in Springfield on alternate months. The Hartford meetings are held at the Hartford Engineers' Club, 12 Haynes St., and the Springfield meetings are held at the Springfield Chamber of Commerce, Broadway and Worthington St., Springfield. Tennant Elwin, Secretary, 117 Hobart St., Meriden, Conn.

DAYTON

Meets first Saturday of each month at the Y. M. C. A., Dayton, Ohio. Secretary, Albert Bates, Box 34, Vandalia, Ohio.

DETROIT

Meets the first and third Friday of each month at the Detroit Testing Laboratory, 554 Bagley Ave., Detroit. Secretary, Geo. Kutxen, 1087 W. State Fair Ave., Detroit, Mich.

GRAND RAPIDS

Meets on the second Wednesday of each month at the Vocational High School, 129 Bostwick Ave., N. E. Secretary, John Raven, 1139 Emerald Ave., Grand Rapids, Mich.

INDIANAPOLIS

Meets the second Saturday of each month at Hotel Denison. Secretary, Louis Mertz, 1725 Union St., Indianapolis, Ind.

MILWAUKEE

Meets second and fourth Thursdays of each month at Lipps Hall. 321 3d St. Secretary, Roy Hunt, 1314 Atkinson Ave., Milwaukee, Wis.

MONTREAL

Meets every Friday at 84 Craig St. West. Secretary, John H. Feelay, 411 Aylmer St., Quebec, Canada.

NEWARK

Meets first and third Fridays of each month at Hotel St. Francis, 22-24 E. Park St., Newark, N. J., at 8 p. m. Secretary-Treasurer, Royal F. Clark, 55 Seymour Ave., Newark, N. J.

NEW YORK

Meets every second and fourth Fridays of each month in the World Building, Park Row, New York City, N. Y. Secretary, J. E. Sterling, 468 Grand Ave., Long Island City, N. Y.

PHILADELPHIA

Meets first Friday of each month in the Harrison Laboratory Building, University of Pennsylvania, 34th and Spruce Sts. Secretary, P. Uhl, 2432 North 29th St., Philadelphia, Pa.

PITTSBURGH

Meets first Saturday of each month at 8 p. m., at United States Bureau of Mines Bldg., Forbes St. Secretary, S. E. Hedden, 227 Fifth St., Aspinwall, Pa.

PROVIDENCE-ATTLEBORO

Meets first and third Thursday of each month at 184 Washington St., Room 308, Providence, R. I. Secretary, Robert Crook, 185 County St., Attleboro, Mass.

READING

Meets on the second Tuesday of each month. Secretary, William M. Fisher, 654 Gordon St., Reading Pa.

ROCHESTER

Meets every second and fourth Saturday of each month at the Powers Hotel. C. A. Reama, Secretary, 512 Lyell Ave., Rochester, N. Y.

ST. LOUIS

Meets first Tuesday of each month at Barr Branch Library, corner Jefferson and Lafayete Sts. Secretary, F. P. Menniges, 3205 A Arsenal St., St. Louis.

TOLEDA

Meets first Thursday of each month at Toledo University Science Building, Electro-Platers' Room, corner Cherry and Page Sts. Secretary, W. W. Weiker, 411 3d St., Toledo, Ohio.

TORONTO

Meets fourth Monday of each month at Canadian Foresters' Hall, 22 College St., Room No. 2. Walter L. Barrows, 628 Dover Court Road, Toronto, Ontario, Canada.

WATERBURY

Meets every second and fourth Friday of each month. Secretary, Wm. F. Guilfoile, 14 Oakland Ave., Waterbury, Conn.